

CLAIMS

What is claimed is:

- 5 1. A display system, comprising:
 at least one light source configured to provide spectrally and spatially
separated light;
 a spatial light modulator configured to receive the spectrally and spatially
separated light and to modulate and selectively transmit selected spatial colors from
10 the light source to form a set of partial images; and
 at least one scanning device configured to receive the set of partial images
and to scan the set of partial images across a viewing area to create a full-frame
color image.
- 15 2. The display system of claim 1, further comprising at least one
projection optic interposed between the scanning device and the viewing area,
wherein the projection optic is configured to receive and project the full-frame color
image onto a viewing area.
- 20 3. The display system of claim 1, wherein the at least one light source
includes:
 at least one white light source; and
 at least one color separator.
- 25 4. The display system of claim 3, wherein the at least one white light
source includes a high-pressure metal halide white light source.
5. The display system of claim 3, wherein the white light source is
selected from the group consisting of a xenon lamp, a halogen lamp, a mercury
30 vapor lamp, a plasma lamp and an incandescent lamp.
6. The display system according to claim 1, wherein the at least one light
source includes a plurality of light sources, each configured to deliver,
simultaneously, a different colored light to the spatial light modulator.

7. The display system according to claim 1, wherein the at least one light source includes at least one prism.

8. The display system of claim 1, wherein the at least one scanning device includes a pivoting mirror.

9. The display system of claim 1 wherein the spatial light modulator includes at least one of a digital micro-mirror device, a grating light valve, a diffractive light device, and a liquid crystal on silicon.

10. The display system according to claim 1, further comprising control electronics in communication with the spatial light modulator and the scanning device and configured for receiving video or image information and synchronously controlling^[PNT-1] the spatial light modulator and the scanning device to generate the full-frame color image.

11. The display system according to claim 1, wherein the spatial light modulator includes an image-forming element having an array of display elements equal to a resolution of the full-frame image.

12. The display system according to claim 1, wherein the spatial light modulator includes an image-forming element having an array of display elements less than a resolution of the full-frame image.

13. The display system according to claim 1, wherein the scanning device includes a polygonal mirror.

14. The display system according to claim 1, wherein the scanning device scans in multiple directions.

15. The display system according to claim 1, wherein the viewing area includes a display surface.

16. The display system according to claim 1, wherein the at least one light source includes an array of dichroic filters.

17. A digital display device, comprising:

5 means for providing spectrally and spatially separated light;
means for modulating component colors from the spectrally and spatially separated light selectively and simultaneously transmitting the modulated component colors along an optical path; and
means positioned in the optical path for sweeping the component colors across a
10 viewing area.

18. The digital projection device according to claim 17, wherein the means for providing spectrally and spatially separated light includes:

a light source for generating white light; and

15 a prism for receiving the white light and generating the spectrally and spatially separated light.

19. The digital projection device according to claim 17 wherein the means for providing spectrally and spatially separated light includes a plurality of light

20 sources, each generating and delivering at least one color.

20. The digital projection device according to claim 17, wherein the means for selectively modulating component colors includes a spatial light modulator.

25 21. The digital projection device according to claim 20, wherein the spatial light modulator includes a digital micro-mirror device.

22. The digital projection device according to claim 17, wherein the means for sweeping the component colors across a viewing area includes a polygonal
30 mirror.

23. The digital projection device according to claim 17, wherein the means for sweeping the component colors across a viewing area includes a pivoting mirror.

24. A method for projecting a color image onto a screen, comprising the steps of:

generating a beam of spectrally and spatially separated light;

5 modulating the beam of spectrally and spatially separated light to form a modulated beam; and

scrolling the modulated beam across the screen to form the color image.

25. The method according to claim 24, wherein generating the beam of
10 spectrally and spatially separated light includes separating the light in a substantially non-temporal manner.

26. The method according to claim 24, wherein said scrolling further
includes receiving the modulated beam and sweeping the modulated beam across
15 the screen to form the color image.

27. The method according to claim 24, wherein said scrolling is
accomplished by utilizing a scanning device.

28. The method according to claim 24, wherein said modulated beam
20 further comprises generated partial images.

29. The method according to claim 28, wherein said partial images are
swept from side to side in an overlapping manner across a viewing screen to form a
25 full-frame color image.

30. A display system, comprising:
at least one white light source;
at least one optical component configured to spectrally and spatially separate
30 the white light source;
at least one reflective light modulator configured to selectively receive the
spectrally and spatially separated light and to modulate and transmit selected spatial
colors from the optical component forming a partial image; and

at least one rotatable mirror configured to receive the partial image and to scan the partial image onto a viewing area to form a full-frame image.

31. A display system, comprising:

5 a light source;

a spatial light modulator configured to receive the light from the light source and to modulate and transmit selected spatial colors in sets of partial images;

a scanning device configured to receive the sets of partial images and scan the sets of partial images to create a full-frame color image.

10 32. The display system of claim 31 wherein the light source includes a set of dichroic filters to spectrally and spatially separate the light before transmitting it to the spatial light modulator.

15 33. The display system of claim 31 wherein the spatial light modulator is a digital micro-mirror device.

34. The display system of claim 31 wherein the spatial light modulator is a diffractive light device.

20 35. The display system of claim 31 wherein the scanning device is a pivotal mirror.

25 36. The display system of claim 31 wherein the scanning device can scan in two orthogonal directions.

37. The display system of claim 31, wherein the scanning device minimizes effects of at least one defective pixel.

30 38. The display system of claim 37, wherein the defective pixel displays an alternate color avoiding non-colored white or black pixels.

39. A method of manufacturing a display system, comprising:

providing at least one light source configured for generating and transmitting spectrally and spatially separating light;

providing a spatial light modulator configured for receiving the spectrally and separated light and selectively transmitting selected spatial colors from the light

5 source to form a set of partial images;

providing at least one scanning device configured for receiving and sweeping the set of partial images to obtain a full-frame color image;

providing projection optics configured for projecting the full-frame color image into a viewing area; and

10 assembling the light source, spatial light modulator, scanning optics and projection optics in a configuration to obtain a display system.